

Locobot QuickStart

Dear Robotics Enthusiast,

Congrats on getting your new Interbotix Locobot platform!

In just a matter of minutes, you will be ready to start your machine learning, manipulation or navigation project. This guide documents how to install ROS and all necessary packages to get up and running with the Interbotix Locobot platform. By default, the Intel computer on the robot comes pre-installed with the latest Ubuntu Desktop image (16.04.7) already on it (can be found at <https://releases.ubuntu.com/16.04/>). After unpacking and assembling the robot, connect a mouse, HDMI monitor, and keyboard to it. If you don't have a USB hub, feel free to temporarily unplug the Kobuki base or the USB cable going to the U2D2 (clear rectangular box) during the installation. However, the RealSense D435 camera must stay plugged in to the computer. Then follow the steps below.

Step 1

Turn on the Kobuki base by flipping the On/Off switch. A green 'Status' light should appear on the base. If the light is yellow, the base must be charged. Next, turn on the battery (located underneath the NUC) by pressing the circular power button. Up to four white LEDs next to the power button should appear. If only one of the four LEDs turn on, the battery must be charged. Next, turn on the NUC by pressing its power button (illuminated in red). The NUC's power button should change to blue when turned on. Confirm that a red light shows up in the U2D2. This means that it's receiving power from the NUC.

Step 2

A login screen should appear on your monitor with **locobot** as the user name. Conveniently, the password is the same as the user name so type *locobot* and hit **Enter**. Next, connect to the Internet, and open up a terminal (press **Ctrl-Alt-T**). Then follow the installation instructions at <https://github.com/facebookresearch/pyrobot#installing-both-pyrobot-and-locobot-dependencies>. Note that at this time, we recommend the full 'Interbotix' version of Pyrobot running on Ubuntu 16.04/ ROS Kinetic & Python 3 (Python 2 has been deprecated since January 2020). To install, enter `./locobot_install_all.sh -t full -p 3 -l interbotix` at the appropriate time in the terminal. The whole process should take about 30 minutes so feel free to grab a snack while waiting!

Step 3

Once the installation is complete, make sure to logout then log back in. At this point, disconnect the monitor, keyboard, and mouse, and reconnect the U2D2 and Kobuki base if you unplugged them. Continue by SSHing into the robot from your personal computer. To do so, type `ssh -X locobot@locobot.local` and follow the prompts. Then type `gnome-terminal &` to bring up the 'gnome-terminal' GUI on your computer. This will allow you to open up as many terminal 'tabs' as you want without having to SSH every time. Now run `roslaunch locobot_control main.launch use_arm:=true use_base:=true use_camera:=true use_rviz:=false` in one tab. If all goes well,

you will see a bunch of text appear on the terminal screen. Wait until the last message appears saying 'You can start planning now!' in green. If no red error messages show up (except for ones warning about the lack of camera calibration), the robot is functioning properly. As an FYI, two messages will show up in yellow saying 'Will publish:' and 'head_tilt_link to camera_link'. This is normal and nothing to worry about. Additionally, if you see an error message saying 'Kobuki: malformed sub-payload detected.' with a string of numbers in brackets, this is also typical and nothing to worry about.

Step 4

With the launch-file above still running, open a new terminal (**Ctrl-Shift-T**), and run `roslaunch locobot_calibration ar_track_alvar_calibration.launch` in it. Finally, open yet another terminal, type `load_pyrobot_env` to source your Python virtual environment, and commence with Step 2 of the calibration instructions at <https://pyrobot.org/docs/calibration> (skip the part that says `source ~/pyeven_pyrobot/bin/activate` and start with the next line that says `cd ~/low_cost_ws/src/pyrobot/robots/Locobot/locobot_calibration/`). The whole procedure should take roughly 10 minutes.

Step 5

With the calibration done, your robot is ready to go! That said, feel free to network your personal computer with the robot by following the instructions at <https://pyrobot.org/docs/network>. Otherwise, check out the demos at <https://pyrobot.org/docs/overview>. For software related questions, create an Issue at Pyrobot's GitHub repository located at <https://github.com/facebookresearch/pyrobot/issues>. For hardware related questions, email us at trsupport@trossenrobotics.com. When done using the robot, don't forget to turn off the computer, battery and Kobuki base!

Tip

For easy debugging of the Dynamixel servo motors that make up the arm and camera pan/tilt servos, check out the Dynamixel Wizard 2.0 tool at https://emanual.robotis.com/docs/en/software/dynamixel/dynamixel_wizard2/#install-linux. With it, you should be able to reference every servo register for all motors.

That's all! Have fun and good luck!

- From the Interbotix Team